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STOATS TURNING WHITE IN WINTER.

By O. V. APLIN, F.L.S., M.B.O.U.

ON February 3rd, 1898, I examined a female Stoat in the flesh, which had been killed in this neighbourhood* the day before, and was nearly white. That is to say, it was white, with the exception of the crown of the head, a space round the eyes, and a stripe down the back of the neck—the black part of the tail of course excepted. It closely resembled one figured in ‘The Field,’ February 20th, 1897. As long ago as 1884 I called attention in ‘The Zoologist’ to the fact that Stoats turned white in mild winters, with reference to that of 1883–4 (Zool. 1884, p. 112). I then mentioned an example killed on January 19th, 1884, which was white, with the exception of a (chance) narrow light brown mark on the near fore leg. Also another, white, save for a dark patch on the crown of the head. The change is not universal in all the individual Stoats in a given locality. For on the day I handled the above-mentioned white one (four days after it was captured) I saw a specimen in the flesh which did not show a sign of white on the upper parts. In the winter of 1895–6 I received information of two partly white Stoats, one pied, the other white, with the exception of the head. In the mild winter of 1881–2 I observed that the change took place in some examples. But white, or partly white, Stoats are naturally far more common in severe winters. After the hard winter of 1890–1, I saw and

* Bloxham, Oxon.

heard of a great many. Few reach the birdstuffers until *after* the severe weather, for Ermine Stoats escape notice until after the snow is gone, when they become very conspicuous.

An interesting question is—Would a Stoat turn white in a winter in which absolutely no cold weather (say, nothing below 30°) occurred? It is worth remembering that during this mild season of 1897-8 we had a few days of sharp frost in the latter end of December, with a good deal of white rime frost. On two nights I registered 22° at four feet from the ground on a north wall, and on four days it froze all day on the ground in the shade.

The change to ermine dress is produced by the white of the belly extending up the sides of the body and over the limbs, until only the top of the head and a band down the middle of the back remain brown. The white then spreads across the lower part of the back (leaving for a time, in some cases, a detached portion of brown near the root of the tail); the spinal line becomes gradually shorter and narrower, and at last disappears. Meanwhile the white on the head has increased, the ears and the region about them have become white, and a space round the eyes and a patch on the top of the head alone remain brown. The latter disappears, and the patches about the eyes decrease, until only a narrow ring of brown round each eye is left. This is actually the last part to turn white. Stoats in this condition have a “spectacled” appearance; I have handled several. One was caught at the end of February or beginning of March, 1891, and another on March 5th, 1894.

In ‘The Zoologist’ for 1888, p. 140, I published some observations which pointed to the fact that the change from white to brown was effected by a change of colour in the fur, and not by a change or moult of the hairs; and that the change began at the tip and not at the base of the hairs. I believe that the change from brown to white is also effected by a change in colour of the hairs, and not by a change in the coat. A change of coat in severe weather would be inconvenient for the animal.



NOTES ON THE BREEDING OF THE CHAFFINCH.

BY CHARLES A. WITCHELL.

SOME years ago, a friend who had bred many hybrid Finches of different kinds told me that hybrids could not be obtained from the Chaffinch, because that bird would not breed in confinement, a flight being necessary for the union of the sexes. This information, and the frequent exhibition of a swooping flight by a pair of Chaffinches, led me to conclude that the swooping flight might be really necessary to the breeding of the Chaffinch; and it may be mentioned that Mr. W. H. Vale, in his 'Handbook of Hybrid Birds' (1896), records that he has not been able to find an authentic instance of a Chaffinch mule.

My present purpose is to offer some remarks on the question whether a love-flight is necessary to the Chaffinch. By "love-flight" I do not mean the common straight Cuckoo-like flight of the male when he is leading a female from tree to tree, and flying with a constant and even succession of wing-beats; but I mean the swooping flight performed by both birds together, in which they are very near each other, if not actually in contact.

During this swooping, the birds always utter the call-note which they particularly address to each other and to their young. It is a little soft sound, something like "chirri" pronounced very rapidly. In April and May this note may be constantly heard. But during the love-flight another sound is sometimes uttered, and this deserves very close attention. Perhaps the simplest mode of describing it will be to give a few instances of its occurrence.

On April 5th, 1896, a pair of Chaffinches near each other in an Austrian pine in a garden at Stroud, in which tree the species nests nearly every season, were uttering the love-call, "chirri." They suddenly darted forth and swooped and swerved close together, both of them uttering the call many times; and during the flight the whole song was given by one of the birds (doubtless the male), but in a hurried manner, ending in a very full low rattle, seemingly lower in pitch than the usual termination of the

song. At that moment the birds had descended to within a foot or so of the ground, and were so close together that they seemed almost as one. They did not separate until, after swerving upward, they had again descended and actually entered a thick pink-may bush. Throughout the incident they were never more than twenty yards distant from me.

On April 19th, near New Eltham (Kent), a male and female Chaffinch were uttering their call-note nearly overhead in an oak. They quitted the tree at the same time and swooped close together, passing within two yards of my head, and swerved up again into another tree. They were squeaking their call all the time, and during the flight, but at a moment when the birds were behind me one of them uttered a brief repetition of a full low note, precisely like the low gurgling rattle which was uttered on a similar occasion by the above-mentioned Chaffinch at Stroud.

On April 20th, at a spot a quarter of a mile from the site of what occurred on the 19th (above described), two Chaffinches were calling in an elm tree. The female was shivering her wings and repeating the love-call very rapidly. A few yards distant from her a male was hopping from twig to twig, exclaiming in the same manner. Both birds swooped, and during the flight the low rattling cry was uttered exactly as it was yesterday. The low rattle is not always heard.

On May 11th two Chaffinches swooped downwards together when passing from tree to tree, and during some portion of the descent they were very close together, breast to breast. They were all the time uttering the "chirri" very rapidly. One was certainly a female, and the other seemed to be a male. The foliage interfered with the view.

On May 12th a pair of Chaffinches descended together from the top of an oak, swerved up again nearly to the full height of the tree (forty feet) and descended as before, uttering the call-note all the while.

I have sometimes seen Chaffinches treading in a tree. The male then alights several times in succession on the female, meanwhile uttering the "chirri"; and at the last attempt, when about to quit the female, he utters the low full rattling note above mentioned, and immediately quits her and makes no further attempt for some time. It appears therefore that this full

cry accompanies the act of coition, and, if so, it is important if the note is sometimes heard when the two sexes are swooping together. It seems to imply that coition may actually occur in the air.

The full rattle is also deserving of observation in relation to the song of the bird, for the greater part of the song is of much the same character as this exclamation; and it is probable that if this full sound had been originally employed during coition, it might have been afterwards employed for the purposes of suggestion, and in course of time might have been elaborated into a comparatively long strain. I venture to think that ornithologists will allow that I have elsewhere ('Evolution of Bird-Song') adduced some reasons for the theory of the development of certain songs (as well as certain alarms) from a repetition of short cries, and the song of the Chaffinch is not without indications of a similar history.

Dr. Butler tells me that the song of the Chaffinch is popularly rendered—

"In another month will come a Wheatear."

The first few notes never show much variation, and in early spring they may sometimes be heard in the form of mere repetitions of the "chirri." The middle of the song consists of a rattling repetition of the same character as the full rattle I have just described. The last syllables, "wheatear," have always seemed to me to be very interesting, as relating the song of the Chaffinch to those of the Greenfinch and Lesser Redpoll. The "wheat" is greatly varied in loudness, and is very often wholly absent, or its place is occupied by a sound like "tissi."

Near Eltham, in April and May, some of the male Chaffinches have a loud single alarm-cry, "zee," which can be heard through all the chorus of birds. This note is sometimes given in the song, but only at one particular part. It then takes the place of the hard penultimate note, "wheat," and whenever given it ends the strain. I called the attention of Mr. A. Holte Macpherson to this note, and he, like myself, had never heard it elsewhere. It seems to me to be a survival from an earlier period. The Chaffinch seems to be losing all trace of this danger-cry, and to be developing instead the full love-rattle. The "chirri," and the "love-rattle," and the "zee," uttered in succession, would constitute an excellent "skeleton" of the Chaffinch's song, and especially so if the first two cries were each repeated a few times.

ORNITHOLOGICAL NOTES FROM MID-WALES.

BY J. H. SALTER.

THOUGH rather late to record the fact, it may be worth noting that an unusually large flock of Bar-tailed Godwits visited the estuary of the Dovey about the first week in September, 1895. Mr. F. T. Feilden tells me that on the day of their arrival he walked to within forty yards of them, and that the flock could not have numbered less than two hundred. Later in the day he got a shot at part of them with a four-bore gun, and bagged eleven, and one Curlew Sandpiper; and a few days later a second shot bagged nine, and one Knot. On Dec. 9th of the same year, at Penglais House, I found, amongst various stuffed birds obtained by the late Captain Richards, a local specimen of the Waxwing, and also the only Cardiganshire Dotterel of which I have any knowledge.

Owing to absence from home I have no notes for the spring and summer of 1896. As already recorded, the late September gales of that year brought an unusual visitation of Sabine's Gull. As far as I can learn, eight were obtained in the course of the three days (Sept. 24th-26th). Another was seen on Sunday morning (27th), and the last one was obtained on the morning of Oct. 8th—which will be long remembered here for its gale and high tide—making in all nine taken, ten seen. A young Black Tern and Grey Phalaropes were obtained at the same time.

On Oct. 22nd, 1896, a Chaffinch was singing its imperfect autumn song, which I have very rarely heard, though Mr. O. V. Aplin (Zool. 1894, p. 412) states that he hears it every year. On Oct. 30th I listened to the Missel Thrush's autumn song, which I only recollect to have heard upon one previous occasion. Common Buntings and a Cirl Bunting were singing freely upon Christmas Day. The latter, an increasing species here, has sung at intervals all through the past autumn and mild winter.

The remainder of my notes refer to the past year.

On Feb. 16th a Stonechat was coming into song, and on March 13th I heard the Wood Lark. A Dipper was sitting on five eggs, which on March 31st appeared to be within a day or two of hatching, under the archway of a stream between Cemmes Road and Llanbrynmair. At the same place a Chiffchaff was silently making its way down the valley from willow to willow, confirming my view that many of the migrants reach Cardiganshire by this route—that followed by the Cambrian Railway. In early April I found Buzzards numerous at Dinas Mawddwy. The snow had driven them down to the woods in the vicinity of the hotel. Only one pair of Ravens was seen; they were making over towards Lake Vyrnwy, the Liverpool reservoir, where they were reported to be nesting on the rocks above the lake. Both pairs of Ravens occupied their usual nesting sites upon the coast near Aberystwyth, and on April 28th I found a pair breeding at Craig y Pistyll; young ones could be heard in the nest. A pair of Choughs occupied their usual sea-cave near the Ravens.

On May 12th, a bitterly cold day, I found Curlews sitting upon three and four eggs respectively. On the 14th I noted a pair of Ravens breeding at the lower end of the Nant Berwyn, near Tregaron. They sailed out from the hill-side, coughing and growling till the rocks rang again. On the same day, at Nant y Stalwen, I saw five stalwart young Ravens, fully fledged, strung up against a barbed-wire fence, and on the following day I was offered two young ones which had been taken that morning from the nest at Pwll Uffern. On the 15th I saw a Kite go down the valley; it was sailing almost in Buzzard style, without much flapping. The birds had attempted to nest once more in their favourite tree, and fresh marks of climbing irons indicated that the eggs had been taken, making the fifth year in succession in which they have been obtained from this nest. A dealer visits the district regularly in quest of Kites' eggs, and the extinction of the birds can only be a matter of a year or two. A Tree Creeper's nest close by was lined with Kites' feathers. A Buzzard's nest contained two newly-hatched young, and an egg from which a third one had failed to extricate itself. By way of provision, the nest contained a half-eaten mole. I was told that in every brood of young Buzzards the strongest individual kills

its nest fellows, and in all cases where I have seen young Buzzards in the nest one precocious chick has bullied the other one, or sometimes two, unmercifully. The next day a second Buzzard's nest contained two eggs which were chipping to hatch.

Pied Flycatchers were singing on every hand, and were already building, though, owing to the backward spring, the oak woods were as bare as at mid-winter. I noticed, as on previous occasions, that the Flycatchers were very fond of tenanting a hole which has been previously occupied by the Greater Spotted Woodpecker.

As usual in this hill-district, I found the Wood Warbler very numerous, almost to the exclusion of the Chiffchaff and Willow Warbler. In the Nant Berwyn its note drew my attention to a Lesser Redpoll, a bird which I have long been on the look-out for, but have never previously seen in this county. It must have been breeding.

On May 19th a Buzzard's nest in the neighbourhood of Pont Erwyd contained one egg which looked incubated. On the night of the 20th, which was still and warm, I heard the Manx Shearwater's note about 11 p.m. In Cwm Woods, on the 23rd, I listened to the Golden Oriole's call coming from the tops of the oaks, followed by its harsh note. Both were familiar, as I had heard them daily on the Rhine. The bird was on migration, and must have passed on at once, as I failed to hear it subsequently. I believe this is the first reliable record for the county.

On May 26th I visited the colony of Lesser Black-backed Gulls upon the Teifi Bog, about twelve miles from the sea. Four nests which were found contained three eggs apiece. About thirty of the birds were on the wing. Five Whimbrel were still upon the strand on May 30th; they continue to pass all through the month.

On June 2nd I saw a Buzzard about the rocks at Pistyll y Llyn. I found a few pairs of Redshanks breeding on June 6th at Mochras Island, south of Harlech. A Nightjar was sitting upon two eggs which were laid upon bits of cork and cinder, the flotsam of an unusually high tide in the lagoon. On the following day I noted a family of Ravens about the rocks at Cwm Bychan lake. A Turtle Dove's nest at Llangorwen contained two eggs which were hatching on June 22nd, and I subsequently heard the

note of this bird at Love's Grove; but so scarce is it as a breeding species in Western Wales that, though always on the look-out for the past six years, I had never met with it previously. The Wood Lark sang on Sept. 30th.

On Oct. 2nd I called to see a Kite in the hands of the local birdstuffer. It was said to be an old male, and was, I am afraid, a member of the small and dwindling colony above mentioned. A Kestrel got up hurriedly from the cliff on Oct. 22nd, dropping a half-eaten Thrush as it rose. I have long thought that the Kestrel's misdeeds in this direction are more numerous than is generally supposed. A pair of Choughs, long absent from this immediate neighbourhood, frequented the hill at the northern end of Aberystwyth all through the autumn, apparently for the sake of hunting for beetles amongst the slates and *débris* due to the making of a tramway.

NOTES ON THE HABITS OF SOME OF THE AUSTRALIAN
MALACOSTRACOUS CRUSTACEA.

By DAVID G. STEAD.

OF the habits of these animals hitherto very little has been known. In descriptions of *any* animals it always seems to me that an insight into their habits and mode of living is quite, or very nearly, as valuable as the scientific diagnosis; but this is the part that is almost invariably neglected. Indeed, many species have been named from old and faded specimens whose proper habitat was not known. Though this is not intended as a "descriptive" paper, I have thought it advisable to place the species in systematic order. Of course, the species enumerated form but a very small portion of those known, there being about 550 recorded species of the Malacostraca in Australia.

Order PODOPHTHALMATA.

Sub-order BRACHYURA.

Tribe OXYRHYNCHA.

1. *Halimus tumidus* (Dana).—This species lives at a depth of from one to three feet below low-tide mark, where it is to be found on or under stones that are covered with seaweed. It is hardly possible to distinguish it unless it is in motion, as the carapace and ambulatory limbs are covered with seaweed of the same kind as that which surrounds it. The seaweed is held on to the Crab by means of the hooked hairs which cover it. Rather common in Port Jackson.

Tribe CYCLOMETOPA.

2. *Ozius truncatus* (M.-Edw.).—This is a species which, as will be at once observed by its conformation, is adapted to living amongst loose stones in rocky situations. There are three well-marked varieties; one, the commonest, being an uniform deep red, with black fingers; another a bluish-grey mottled variety; and the other white, which is only found of a small size.

3. *Pseudocarcinus gigas* (M.-Edw.).—"The Giant Crab."—As its specific name implies, this is a giant amongst crustaceans, the carapace sometimes reaching a breadth of two feet. On account of the enormous size of the chelæ, it can give a tremendous crush—we cannot call it a "nip"—with those weapons. Its habitat is Bass's Strait, between Tasmania and Victoria, where it lives amongst stones, for which it is well adapted, as, if it kept perfectly still, there would be some difficulty in discriminating between the stones and the Crab. The colour varies from red to yellow, with black fingers.

4. *Pilumnus fissifrons* (Stimps.).—This small species frequents stones, &c. (just below low-tide mark), which are covered with mud and algæ, and is common around the shores of Port Jackson. The carapace being very setose, catches and holds sediment, thus giving the Crab the appearance of a small round protuberance on the stone which it frequents.

5. *Pilumnopeus serratifrons* (Kin.).—Common on rocky shores of Port Jackson and other inlets along the coast of New South Wales, especially in those parts that are covered with small stones, under which they seek concealment. They are subject to a good deal of variation in colour. Length of carapace, $\frac{3}{4}$ in.; breadth, 1 in. Found along the east coast of Australia, and in New Zealand.

6. *Leptodius exaratus* (M.-Edw.).—May be procured in similar situations to the preceding, but is not very common. The carapace is very flat, and the last pair of ambulatory legs is twisted upwards to enable it to grasp the under surface of stones, under which it has sought refuge. In coloration it varies according to situation, some being white, others mottled, and others quite black.

7. *Neptunus pelagicus* (M.-Edw.).—A species which is very widely diffused, undergoes a good deal of variation, and is very abundant. It is the common Edible Crab of the Sydney fish-market. One peculiarity which I have noticed is that the sexes for the most part of the year live strictly apart. I have seen at one time scores of females with not one male among them, and *vice versa*. To be quite sure, I enquired of the fishermen whether they put them in separate heaps, but they assured me that they did not. This form is very nearly allied to the *Lupa bellicosa* of America.

8. *Neptunus sanguinolentus* (M.-Edw.).—This species is rather common, and specimens of a small size are extremely abundant. But few of them arrive at a large size. This falling-off, I think, is mainly due to the attacks of its congener the quarrelsome and almost ubiquitous *N. pelagicus*, which species is a great check on the diffusion and growth of very many of the pelagic Crustacea. Not being so good—from an epicurean point of view—as *N. pelagicus*, it is but little sought after. It has an extremely beautiful appearance, the carapace showing iridescent colours, and having on it three spots like drops of blood, surrounded by bluish white rings, one on either side on the epibranchial regions and one almost on the posterior border of the carapace, over the intestinal region. It leads a pelagic life, and is widely disseminated.

9. *Charybdis cruciatus* (Herbst).—This is, in my opinion, the most beautiful of our Crustacea. When fresh, its rich tints cannot be surpassed by anything in Nature. It may be seen occasionally in company with *N. pelagicus* at the fish-market, but is very uncommon. I have never found it in its young state.

10. *Scylla serrata* (De Haan).—This is the largest Crab to be seen in the Sydney fish-market. Like *N. pelagicus*, it is pelagic, but is not nearly so common. The carapace is generally of a dark green colour. It has a wide distribution, reaching from Japan to Australia. Around the anterior border of the carapace there is a row of sharp conical spines. Any refractory prisoner is quickly put an end to by being pressed against these.

11. *Thalamita sima* (M.-Edw.).—Does not attain a large size, and is essentially pelagic. It is rather common in our bays and harbours. Carapace and chelæ shortly setose, and of a greenish hue.

12. *Thalamita admete* (Herbst).—This is a very small pelagic Crab. I have observed it in tiny pools in rocky situations at Port Jackson.

13. *Nectocarcinus integrifrons* (M.-Edw.).—Though adapted for a free-swimming existence, this species lives to a great extent on the bottom in shallow water, amongst seaweed. It is not of uncommon occurrence for green *Fucus* to be found growing on its legs and carapace, which are very setose. East coast of Australia and New Zealand.

14. *Platyonychus bipustulatus* (M.-Edw.).—This pelagic spe-

cies is very common in its young state, but a great many must fall a prey to their many enemies, amongst the chief of which may be reckoned *Neptunus pelagicus*, as large ones are of rare occurrence. One that I have procured measures 10 centimetres across the carapace, but specimens of this size are seldom found. It has a wide distribution : East coast of Australia, New Zealand, Japan, and China.

Tribe CATAMETOPA or GRAPSOIDEA.

15. *Macrophthalmus setosus* (M.-Edw.). — This species is essentially a burrowing one, frequenting mud-flats. Its burrows may be found here and there among those of *Helæcius cordiformis* (q. v.), but cannot be mistaken for the latter on account of the acute angle it makes with the surface, whereas the burrows of *H. cordiformis* are vertical and smaller. Colour yellowish brown, covered with setæ. Port Jackson, New South Wales. Common.

16. *Helæcius cordiformis* (Dana).—Found in similar situations to the preceding, but is much more common. The mud-flats, where these animals dwell, possess a most animated appearance, and remind the observer very forcibly of a busy city, of which the soldiers are *Mycterus longicarpus* (q. v.) and the civilians *H. cordiformis* (of which there are myriads), and all their little legs moving in concert make quite a great clatter. They are extremely amusing. On anyone approaching they show fight at once, holding up their comparatively large "nippers" as high as they can, so that as they retreat—which they do with their "faces to the foe"—they very often roll over backwards, so eager are they to show their weapons. The very rotund body is of a deep reddish brown colour. New South Wales, Tasmania.

17. *Ocypoda cordimana* (Desm.). — The Crabs of this genus are noted for their extreme swiftness of foot; indeed, they run so fast, and their colour assimilates so well with the sand, that they appear like pieces of cotton-wool or feathers being blown along by the wind. They are found wherever there is a good stretch of sandy beach, in which they make their burrows. These burrows average about 2 ft. in depth. East coast of Australia.

18. *Grapsus variegatus* (Latr.). — This is, without doubt, the dominant species of Crustacea in Australian waters, is distributed over a wide area, and presents great variation. They are found in great numbers all along the rocks at low tide, but scurry off

into the crevices with great rapidity when disturbed. Though not pelagic, their flattened legs enable them to swim very well. They vary in colour from a deep green with faint yellow streaks to a bright yellow and red. Coast of Australia, New Zealand, Norfolk Island, California, and Chili.

19. *Pachygrapsus transversus* (Gibb.). — Inhabits short seaweed about midway between high- and low-tide marks. It is also obtained in crevices of rocks amongst small stones, and amongst sessile ascidians. In appearance it is something like a small specimen of *G. variegatus*, but may be at once distinguished by the bristles which clothe the legs. Port Jackson.

20. *Cyclograpsus Lavauxi* (M.-Edw.). — Common round Port Jackson in situations where the shore is covered with clean stones—*i.e.* stones free from algae and mud—nearly at the limit of high tide. They are very interesting, especially in the operation of disengaging them from your fingers, which is no easy matter if they once get a good grip. The colour is a beautiful red dorsally, with white on the ventral side. Port Jackson.

21. *Chasmagnathus lœvis* (Dana).—Found as a rule in muddy situations wherever there are stones, under which it burrows. It also avails itself of the burrows made by *Macrophthalmus setosus*. Colour deep brown, dotted on the carapace with yellow. Port Jackson.

22. *Sesarma erythroductyla* (Hess.).—The observer will be at once struck with the great disparity in coloration between the male and female. The female is always a dull brownish colour, while the male exhibits great variation, the carapace being sometimes a brilliant green. The chelæ in both sexes are tipped with red. Common on mud-flats under stones. Port Jackson.

23. *Plagusia chabrus* (Miers). — This species inhabits the short red seaweed which clothes the rocks just below low-tide mark. It is very seldom seen to leave the water of its own accord, but, if it does so, returns almost immediately. It subsists chiefly on vegetable matter (*Fucus* and algae), but consumes animal matter whenever it is available. The outstretched limbs cover an expanse of about 10 in. The carapace and dorsal aspect of ambulatory limbs are covered with a short dense red pubescence. Widely distributed: Port Jackson, New South Wales; Tasmania, New Zealand, Cape of Good Hope, and Chili.

24. *Plagusia glabra* (Dana).—Rather common along the coast of New South Wales, where it is found in small rock-pools and crevices at low tide. It does not often leave the water, and is essentially a vegetarian. Legs and body are far more rotund than the preceding, and not at all setose. I am without doubt that Milne-Edwards' description of *Heterograpsus octodentatus* has been drawn from the young of this species. There is a great difference between the colour of old and young specimens. Young ones are chiefly of a yellowish tinge, with black spots; while old ones are of a very dark colour, with traces of yellow on the metabranchial regions. They form most handsome objects in the water when the sun is shining on them, showing up their beautiful tints. Port Jackson, New South Wales.

25. *Mycterus longicarpus* (Latr.).—Commonly designated the "Soldier Crab." It is at once a marvellous and strange sight to see thousands of these crustaceans on the low mud-sand-flats, marching about in regular battalions after the tide has ebbed. Scarcely ever is one to be seen singly but it is scurrying off to meet a company; and here and there will be seen an extra large one, acting no doubt as an officer. Their military appearance is considerably heightened by the colours, which are as follows:—branchiostegites dark blue (these being very prominent); remainder of carapace pale blue; legs yellow, with a red band at each joint. Third pair of maxillipedes very large. Port Jackson; Victoria.

26. *Mycterus platycheles* (M.-Edw.).—This species is found in very similar situations to the preceding, but has not so great a propensity for travelling in companies. Port Jackson.

27. *Hymenosoma varium* (Hasw.).—This minute species undergoes a good deal of variation, and inhabits many different situations. Most frequently it is found in short seaweed just below low water, though I have procured it from amongst minute pebbles and from mud. Some specimens are beautifully marked. East coast of Australia, Tasmania, and New Zealand.

Sub-order MACRURA.

Tribe ANOMALA.

28. *Eupagurus sinuatus* (Stimpson).—This is one of the commonest and most beautiful of our Hermit Crabs, frequenting

rock-pools. In choosing its domicile it seems to have a decided partiality for the shell of *Purpura succincta*. It may often be found in the act of house-hunting, though in general choosing a shell a few sizes too large, so that there is no need to make a change until several ecdyses, or moults, have taken place. Port Jackson, Bondi, New South Wales.

29. *Paguristes barbatus* (Hell.).—Another of the "Hermits"; not so common nor so large as the preceding. I have found it inhabiting the shells of *Purpura succincta*, *Monodon zebra*, and *Neritina punctata*. Port Jackson.

30. *Porcellana dispar* (Stimp.).—This species frequents stones covered with mud and algae that are found just below low-tide mark. If one of the stones be picked up out of the water these crustaceans will not, at first, be observed, as they appear precisely similar to dirty little pieces of seaweed or mud as they slide down towards the water. Very common round the shores of Port Jackson. The carapace is about three-sixteenths of an inch in width.

Tribe THALASSINIDEA.

31. *Callianassa* sp. ?—Inhabits the same localities as *Mycterus longicarpus*, but burrows deeper, and subsists on mud-worms. Though it is classed amongst the Podophthalmatous Crustacea, its eyes, which are reduced to mere dots, are sessile. This is not to be wondered at, inasmuch as it has very little need for eyesight, spending as it does most of its time burrowing, and but rarely coming to the surface. In colour it is of a yellowish pink, as a rule, but is sometimes white. Port Jackson; not very common. Length, $2\frac{1}{2}$ in. from rostrum to telson; large cheliped, $1\frac{1}{2}$ in. long.

Tribe SCYLLARIDEA.

32. *Ibacus Peronii* (Leach).—The members of this species pass most of their time on a muddy bottom, in not very shallow water. They are of a beautiful salmon-colour. Length, 9 in. Rare. Port Jackson.

33. *Palinurus Hügelii* (Hell.).—Closely allied to the British Rock Lobster (*P. vulgaris*). It is the common Sydney Crawfish, and sometimes grows to the length of 24 in. Subsists on a vegetarian diet, viz. fibrous marine plants. Rocky coasts of New South Wales.

Tribe ASTACIDEA.

34. *Astacopsis serratus* (Shaw).—This animal has been given different names by different naturalists, on account of some of them getting large and some small specimens. In large examples the abdominal somites are each armed with a row of strong conical spines, but in young specimens these are either rudimentary or quite absent. There are also other differences. It is distributed with some variation over most parts of New South Wales. The colour, which also varies, is most commonly of a deep red. Attains a length of 18 in. Huxley mentions it in his book, 'The Crayfish,' under the name of "Australian Crayfish."

Tribe PENAEIDEA.

35. *Penaeus canaliculatus* (Oliv.).—This is truly a handsome species, having, when alive, the most delicate tints, and sometimes growing to the great length (for a Prawn) of 10 in. It is one of the principal Prawns of the Sydney fish-market, but is not so common as its congener, *P. esculentus*. Port Jackson; Botany Bay; Japan.

36. *Penaeus esculentus* (Hasw.). — The common Prawn of Sydney, and caught in great numbers with the nets. This genus is remarkable for the large membranous appendage attached to the base of the first pleopod of the male, and called by Spence-Bate the "petasma," or curtain. In the female this appendage is quite rudimentary. Port Jackson; Port Darwin. Incidentally it might be mentioned that when the term "Prawn" is mentioned the genus *Penaeus* is meant; *Palæmon*, to which the English Prawn belongs, not being known here as an article of diet.

Tribe CARIDEA.

37. *Rhynchocinetes typus* (M.-Edw.).—This species surpasses in beauty any crustaceans that I have ever observed, the body being a beautiful semi-transparent tint, with here and there spots of light blue dotted over it. The chelæ are red with white dactyli. Altogether it is most disappointing to see their magnificent colours fade so much when the animals are preserved. They frequent semi-dark situations below low-tide mark, and if taken and put in a bottle containing sea-water die in a very short time, though

(as stated elsewhere) I have kept specimens of *Leander intermedius*, an allied form, for a week in the same bottle. At present the only way I can account for it, is, that the light, coming as it does through the sides of the bottle, is too strong for them, or that they require a constant stream of water. It could not be a question of difference of pressure, as they are procured in shallow water. Though darting away at the slightest movement, a person may attract them by keeping his hand in the water for some time, when they will presently be seen issuing in numbers from all the cracks and crannies, though before not one was visible. They must be attracted by their sense of smell, as I have often seen them advancing steadily towards my hand when there was no possible chance of them seeing it. A good deal of reconnoitring is done before they make up their minds to come close, and then the smallest specimens always come first. Altogether this species forms one of the most interesting and amusing of the Crustacea. Port Jackson ; New Zealand ; Chilé.

38. *Alpheus Edwardsii* (White).—These crustaceans are rather common in Port Jackson, and are familiarly known as "Nippers." They may be caught in tiny rock-pools under stones at low tide, and are also procured in nets, in company with *Penaeus esculentus*. They are very remarkable for their habit of making a sharp clicking noise with the large chela when caught or irritated. The sound resembles that made by cocking a pistol very quickly, and, if the animals happen to be in a bottle, you really have to look every now and again to make sure that it is not being cracked to pieces, so sharp is the sound. Colour, light green on carapace, and traces of red on abdominal somites.

39. *Leander intermedius* (Stimp.).—Common all along our coast in small rock-pools (left by the tide as it recedes), in which, if disturbed, they seek the shelter of any small stones which are lying about. They are very hardy, as I have well proved. I kept a few of them alive in a bottleful of sea-water for a week without once changing it, while some specimens of *Rhynchocinetes typus* which were put in at the same time died within three or four hours. This difference, which I have noticed repeatedly, is hard to account for. The integument is translucent, and covered with small red spots, which are noticeable even upon the embryo within the ovum.

40. *Alope palpalis* (White).—May be found in shady nooks amongst the rocks at low tide, but is not at all common. It must also occasionally swim freely, as I have taken it from the stomach of the "Jew-fish" (*Sciæna antarctica*). Covered with short red setæ. Palpi very large. Port Jackson.

Tribe STOMATOPODA.

41. *Squilla lœvis* (Hess).—The common "Hass-crab" of Port Jackson. Caught principally in the Prawn-nets, travelling in company with *Penæus esculentus*, on which it partly subsists. It may often be procured from the stomach of *Sciæna antarctica*, of which fish it forms one of the principal articles of food. Coast of New South Wales.

Order EDRIOPHTHALMATA.

Sub-order ISOPODA.

Tribe FLABELLIFERA.

42. *Ceratothoa trigonocephala* (Leach).—This is the commonest and best known of our fish parasites. As a rule, it inhabits the mouth of the "Yellow-tail," *Trachurus declivis* (C. & V.). The head is almost triangular, and deeply encased in the anterior portion of thorax. The *Ceratothoa* embryo is very different to the adult. The five segments of the pleon, which in the adult have coalesced, are movable upon each other. Pleon is nearly as long as pereion, but in the adult it is so insignificant as to be scarcely so long as one pereion somite. The telson too widens out posteriorly when the animal reaches maturity. Altogether the young *Ceratothoa* is fitted for a free existence, and no doubt the adult was the same at one time, but has been gradually adapted to living a parasitic life, thereby undergoing change of formation. Colour white. Port Jackson.

43. *Nerocila* sp.?—This Isopod is another of the parasitic Crustacea, having for its host the Sea-mullet, *Mugil grandis* (Cast.). It is not so convex as the preceding species, and the epimera are very long. Eyes are entirely wanting. Colour sometimes dark brown, also yellow.

44. *Cymodocea pubescens* (Hasw.).—The small crustaceans of this name are "rock-borers." The boring is done exclusively with the uropods, which form two strong spikes. In burrowing

they do not go in head first, but stand on the one place, simply turning round and round, as if on a pivot, with their urópods lowered and cutting as they go. They no doubt assist very materially in the disintegration of the rocks, honeycombing them to such an extent that they are easily broken up by the waves into sand, and so contribute to form the rocks of a future geological period. When these Isopods are captured they draw themselves up into a ball, and project their uropods, which are very strong and sharp. Fawn-colour along dorsal line, reddish brown at sides of somites. Port Jackson.

Sub-order AMPHIPODA.

Tribe GRAMMARIDEÆ.

45. *Talorchestia quadrimana* (Hasw.).—This is the common Sand-hopper, found in great numbers along the whole coast of New South Wales, wherever there are masses of decaying vegetable or animal matter. Length, 7 lines.

NOTES AND QUERIES.

MAMMALIA.

CARNIVORA.

Stoats turning White in Winter.—In January last I received a Stoat (*Mustela erminea*) in almost white fur; it was shot at Newport, Salop, many years back (I did not book the date), but I distinctly remember that it was a very mild winter. I got one from the Isle of Wight which was quite white. I have so repeatedly had these animals in the partially white dress during mild winters that I do not now associate them with severe weather.—F. COBURN (7, Holloway Head, Birmingham).

Badgers near Scarborough.—A pair of *Meles taxus*, male and female, were captured alive at Thornton Dale, near Pickering, during the first week in March. These animals are not so uncommon in the district surrounding Scarborough and Pickering as is generally supposed, and they may be found in almost all the larger woods, but are rarely seen.—W. J. CLARKE (44, Huntriss Row, Scarborough).

UNGULATA.

Existing Specimens of *Equus quagga*.—The material for the study of this interesting and now extinct ungulate is so limited that I may mention a few specimens observed by me when preparing an illustrated lecture on the *Equidae*, since given on several occasions. There is a stuffed Quagga in the Natural History Museum at South Kensington, one in the Tring Museum, another in the museum at Berne, and a smaller specimen in the museum of the Jardin des Plantes, Paris. When in Paris, I also had the pleasure of seeing the living representatives of the now rare *Equus zebra*, then exhibited to the public, one at the Jardin des Plantes, the other at the Jardin d'Acclimatation. I understand that there is a fifth Quagga preserved at Edinburgh, and I have seen an equine skeleton said to belong to this species in the Medical Museum of the Owens College, Manchester. A full census of the remains of the Quagga, such as has been compiled for the Great Auk, would be of much value to zoologists.—GRAHAM RENSHAW (Sale Bridge House, Sale, Manchester).

[A specimen (young) of *Equus quagga* is contained in the South African Museum, Cape Town, which I had the pleasure of seeing when visiting that establishment.—ED.]

A V E S.

Breeding Sites of Chiffchaff and Willow Warbler.—Twice within recent years, in columns devoted to matters ornithological, has an animated discussion raged round the question of what are the normal respective nesting sites of the Chiffchaff (*Phylloscopus rufus*) and Willow Warbler (*P. trochilus*). Ornithology is essentially a progressive science, hence what is latest "up to date"—assuming, that is to say, the excellence of what is treated of—is of chiefest value. In this connection it is pleasant to find such a past master as Mr. Howard Saunders publishing, in monthly parts now issuing, a second edition of his charming 'Manual.' However, what I wished to say was this: I much hope that those who heretofore took up what seemed to me a wholly untenable position with regard to the two points at issue have noted that the most recent authority in the field, who is admittedly "at the top of the tree," has not only placed it on record that the nest of the Chiffchaff is usually "a little *above* the ground," and that of the Willow Warbler generally "*on* the ground," but that he has thought well to emphasize his views by the employment, as shown, of italics. I trust now we shall hear no more about Chiffchaffs' nests in meadow-banks, away from all sylvan tracts, which of course are the popular haunts of the species in this country in the summer.—H. S. DAVENPORT (Melton Mowbray).

Meadow Pipits perching on Trees.—In Mr. W. Warde Fowler's interesting note on the Tree Pipit (*ante*, p. 122), it is said that the Meadow Pipit (*Anthus pratensis*) "is certainly not at home on trees." This seems to be a fairly general belief among ornithologists, but so far as my experience goes it is not correct. During the winter months I have Meadow Pipits under almost daily observation, and it is an absolutely common occurrence for me to frighten them from a low-lying meadow, when they will take to the branches of the tall trees around. They will freely settle on some of the thinner branches, as well as on the thick ones. I have also repeatedly heard their notes proceeding from among the branches of the trees, where they had settled from choice, without having been disturbed by me. The meadow I refer to is at the bottom of the road in which I reside, and I have to cross it on all my walks. While I was on Achill Island, Co. Mayo, a curious bird, which Mr. Oliver V. Aplin determines to be *Anthus pratensis*, settled on the top of a low bush, and looked so curious, as it faced me with its dark broadly striped breast and rufous throat (a far clearer rufous tinge in the living bird than is now to be seen in the mounted specimen), that I was constrained to bring it down, thinking I had something unusual. This was on the mountain side, a considerable distance from their usual breeding haunts on the moorland and marshy meadows below. From the worn

appearance of the feathers I concluded that the bird was probably breeding, and searched diligently for a nest, but without success.—F. COBURN (7, Holloway Head, Birmingham).

Food of the Barn Owl.—So much has been written in connection with the food of this species and its admitted usefulness to the farmer, that little remains to be added. During the recent gales in March a great elm near my house was blown down. This tree had to my knowledge, for forty-five years, been the residence of a pair of Barn Owls (*Strix flammea*), who regularly nested there. Since the loss of their home I have had a small barrel, duly prepared, fixed amongst the boughs of an ancient yew, hoping thus to persuade my old neighbours to remain with us. On sawing the rotten stem of the elm into sections we found bushels of Owls' castings; these were composed of a vast number of the Common Mouse, also some Long-tailed and Short-tailed Mice, the skull of a Starling, and hundreds of the skulls and upper mandible of the House Sparrow. The Mice and Sparrows were no doubt seized from the stack-sides, for I have often seen the Owls thus employed, or sitting on the watch hard by on some post of vantage. The tenant could never understand how it was I was so anxious that the Owls should be left unmolested, and this exhibition of the *disjecta membra* of hundreds of Mice and Sparrows has come like a revelation to him. Farmers here have an absurd idea that Owls enter their Pigeon-cotes and carry off the young Pigeons, and it appears impossible to persuade them to the contrary.—JOHN CORDEAUX (Great Cotes House, R.S.O., Lincoln).

Rare Partridges in Leadenhall Market.—I observed in the 'Field' of the 19th March a notice from the pen of my friend Mr. Tegetmeier of the presence of a large number of Daurian Partridges in Leadenhall Market, and may remark that this is the second time that a consignment of these birds has been offered for sale in that market. I saw the first lot unpacked, and they were rolled in paper and hard frozen, and then packed in a large sugar-barrel, and arrived here in very good condition. The Daurian Partridge (*Perdix daurica* and *P. sibirica* of Pallas, *Perdix barbata*, Verr.) inhabits Eastern Siberia, the Amoor country, Dauria, &c., ranging south through Mantchuria and Mongolia to North China, and west to the Tian-Shan Mountains in Turkestan; so that the birds sold here must have traversed a great distance in a frozen state before reaching this country. This Partridge is not a rare bird in museums, or indeed in private collections, and can be had of most continental dealers, and is quite distinct from our European Partridge. Simultaneously a considerable number of Red-legged Partridges from Central Asia (*Caccabis magna*, Prjev.) were on sale in Leadenhall Market. The range of this species is given by Mr. Ogilvy-

Grant as the "South Koko-nor Mountains, Northern Tibet, and the Tsaidam plains."—H. E. DRESSER (Topclyffe Grange, Farnborough, Kent).

Canada Goose near Dungeness.—I had sent to me in the flesh two specimens of the Canada Goose (*Bernicla canadensis*) on April 26th, which were shot out of a flock of five on the sands near Dungeness, Kent, about a week before. They show no signs of having been pinioned, and flew in from the sea. The heaviest one was a male, and weighed, a week after its death, 10 lb. 8 oz. I see Mr. Howard Saunders, in his 'Manual,' does not acknowledge the occurrence of any genuine wild examples in this country. I should be happy to forward the skins to any competent authority.—GEORGE W. BRADSHAW (54, London Street, Reading, late of Hastings, Sussex).

Little Gull in Kent.—On March 3rd, near Horsmonden, a fine adult male of *Larus minutus* was obtained, and sent to Springett, the taxidermist in Cranbrook. Horsmonden is about twelve miles as the crow flies from the river Rother.—BOYD ALEXANDER (Swifts Place, Cranbrook, Kent).

Birds which nest in London.—In your last number (*ante*, p. 189) Mr. C. Meade King asks for notes on this subject. Two birds might be added to the list, both having nested in Regent's Park within the last two years, *viz.* Magpie (*Pica rustica*) and Pied Wagtail (*Motacilla lugubris*). I do not know if the former has actually reared young, but the latter species was perfectly successful in the gardens of Regent's Park in 1896. As to the number of Rooks breeding in Gray's Inn, there are ten or twelve nests occupied at the present time.—WILLIAM E. DE WINTON (7, Southampton Row, W.C.).

Some Notes on the Nestor notabilis, or Kea Parrot, of New Zealand.—Some live specimens of this interesting bird of New Zealand have lately been received by the Director of the Zoological Gardens in Melbourne. The peculiar birds have acquired the habit of attacking Sheep, and making holes by means of their sharp and powerful beaks in the backs of these animals for the purpose of abstracting the kidney fat, which appears to be esteemed as a luxurious diet. A large number of Sheep are annually destroyed by these birds, which has compelled Sheep-owners to set a value upon their heads, and endeavour to accomplish their extinction. It was for a long time supposed that this peculiar habit or instinct was developed by the bird getting the fat from the skins of Sheep that had been slaughtered, but this solution was never satisfactory to my mind, as there appeared nothing to connect the fat on the skins of Sheep with the live animals. I desire to offer the following solution of the mystery, which seems to me to be simple and satisfactory, and more rational than the Sheep-skin theory. In the hilly districts of the Middle Island of New Zealand there is a great abun-

dance of a white moss or lichen, which exactly resembles a lump of white wool, so much so that a friend of mine who was travelling through the country asked the driver of the coach why there were so many solitary Sheep scattered all over the hills, and was informed that these were bunches of lichen or white moss, at the roots of which were found small white fatty substances, supposed by some to be the seeds of the plant, and by others to be a grub or maggot which infested it, and which is the favourite food of the Kea. I saw a specimen of this woolly lichen which so closely resembled a bit of wool as to be easily mistaken for it. No doubt the bird, misled by this resemblance, commenced an exploration in Sheep, and this proving satisfactory originated the new habit.—F. R. GODFREY (Melbourne).

[The above note has been kindly forwarded to me by Dr. P. L. Sclater. In 'The Zoologist' (1895, p. 293) will be found a paper "On the Habits of the Kea, or Mountain Parrot of New Zealand," by Taylor White, reproduced from the 'Transactions' of the New Zealand Institute, vol. xxvii. pp. 273–280 (1895), in which the author agrees with Mr. Huddlestone that the bird settles on the Sheep above the kidneys, because it is the broadest part, and it can there obtain the best grip of the wool, and that blood rather than flesh is what the bird desires. Mr. Godfrey is also in agreement with Mr. F. R. Chapman ('New Zealand Journal of Science,' 1891), who, describing a valley of the Upper Waimakariri, Canterbury, says:—"A very interesting *Raoulia*, or vegetable sheep, was very plentiful on steep rocky places; but I believe a finer species is found on Mount Torlesse. . . . It is said that the Keas tear them up with their powerful beaks, and that these birds learnt to eat mutton through mistaking dead Sheep for masses of *Raoulia*.—ED.]

Sagacity among Birds.—Some few years ago, when staying at the Great Eastern Hotel, Calcutta, I witnessed an interesting scene between three birds. It was early in the morning, and when sitting in my room I noticed a Hawk alight on the ledge about a foot wide that ran round the building. The Hawk rested just opposite my window, but did not apparently see me; it had a bone in its talons, and was soon hard at work endeavouring to tear off what little meat there was on it. But in about a minute's time two Crows arrived on the scene; one flew behind the Hawk, and the other in front. The bird behind kept coming up and giving a smart tug at the tail of the Hawk, which made him turn half-round to drive the bold intruder off, but still holding its bone. After this had been done several times the Crow gave an extra hard pull at the Hawk's tail; that bird then disengaged its foot from the bone, and, turning half-round, made a lunge towards the Crow to drive it away; but immediately the Hawk had let go the bone and turned round, the other Crow in front, which

had all the time been keeping just out of reach, immediately seized the bone, and at once flew off with it to the street below, where it was quickly joined by the other Crow, and the two birds enjoyed what they could get off the ill-gotten bone together. There being a fair number of people passing along the road, the Hawk dare not follow them, but was left outwitted on the ledge. I have no doubt similar instances have been observed by others, showing the sagacity of many birds, and I only record this note as I think that any interesting fact in bird-life should be published, and by so doing ornithologists help one another in the study of this interesting branch of natural history.—D. LE SOUËF, Assist. Direct. Zoological Gardens, Melbourne.

Ornithological Notes at Alum Bay, Isle of Wight.—The precipitous chalk cliffs stretching from Freshwater Bay to Alum Bay, in the Isle of Wight, are the favourite breeding resort of many of our sea-birds. While staying at Alum Bay, at the beginning of last month (April), I had a good opportunity of seeing them at the commencement of their breeding season, as their favourite place is the Alum Bay end. Looking over the edge of the cliff from the Alum Bay downs, at one particular spot, one sees countless Herring Gulls flying about in all directions; rows of Razorbills and Guillemots sitting on the ledges in the cliff, or dotted about in the blue sea far below; Cormorants flying to and fro; and an occasional Rock Pigeon darting out of some crevice, and whirling away out of sight with its rapid flight. Jackdaws too breed in great numbers in the crevices in the chalk, and a pair of Ravens have a nest every year somewhere in the cliff. I saw them several times wheeling about and tumbling over in the air in their peculiar manner, evidently on the look-out for Gulls' eggs wherewith to feed their young ones. My brother saw two pitched battles between one of the Ravens and a Herring Gull, in which the two birds clung on to each other, and rolled down the cliff like a black-and-white ball. But the way to see the birds to advantage is to get a boat, and row from Alum Bay round "the Needles," and a little way down the coast towards Freshwater. With a view to doing this, I interviewed a fisherman of the name of Isaacs, who seems to be the great local authority on the birds. He told me that a pair of Peregrine Falcons bred on the cliffs every year, and that many years ago he had taken both eggs and young birds, but that they had not now been disturbed for a long time. He also said that the Shag and Great Black-backed Gulls bred there in small numbers. On April 16th a friend and I were rowed round by him. It was a perfect morning, and the sea was as calm as a lake. Herring Gulls and Cormorants were flying about and sitting on "the Needles" rocks as we approached, but when we had rounded "the Needles" and gone a little way down the coast, the sight was wonderful. Herring Gulls swarmed in the air and on the rocks. Rows upon rows

of Guillemots and Razorbills covered the ledges all over the face of the cliff, and as we passed flew off in thousands over the boat and settled in the water beyond. Large colonies of Cormorants were scattered about on the cliff, flocks of Jackdaws wheeled about with clamorous cries, and here and there a family of Puffins would fly out of some crevice and settle in the water round the boat. They do not seem so strong on the wing as the Guillemots, and when getting up from the sea splash a long way through the water before rising into the air. As we rowed by, a splendid Peregrine Falcon came out of a large crevice high up on the cliff, and flew rapidly down the coast out of sight. A few minutes afterwards we saw its mate. On the broken rocks and boulders of chalk which line the base of the cliffs several Rock Pipits were hopping about. I landed among these rocks, and found about a dozen Herring Gulls' nests, all empty. The Herring Gulls are the only birds which build so low down on the cliff, and the eggs of the other birds can only be got by means of a rope. It was a most interesting sight, and I only wished it had been later in the season, so that I could have got some eggs. In conclusion, I may add that Isaacs said the birds had greatly increased in numbers during the last ten years.—BERNARD RIVIERE (Finchley Road).

Ornithological Notes from Scarborough.—On Jan. 15th I had brought for preservation a fine adult Shoveler Drake (*Spatula clypeata*) which had been shot on the river at Pickering. On Feb. 23rd a pair of beautiful adult Waxwings (*Ampelis garrulus*) were brought in, which had been shot on the roadside between Scarborough and Burniston. They were male and female, and were in company with a third, which escaped. On dissection I found they had been feeding upon the fruit of the wild rose, which they had swallowed whole. These make ten occurrences of this species, of which I have notes, since October last. More Crossbills than usual have frequented the fir woods throughout the district near Scarborough, and were still here up to within a month ago.—W. J. CLARKE (44, Huntriss Row, Scarborough).

PISCES.

Notes from Great Yarmouth.—Sole. I received a Sole (*Solea vulgaris*) from the fish-wharf on Jan. 22nd. It was peculiarly stunted in length, measuring $11\frac{1}{2}$ in.; it was 6 in. broad, being at least 4 in. short of its normal length.

Streaked Gurnard. An example of *Trigla lineata* came to hand on the same date.

Pole or Craig-fluke. No fewer than six pairs of fine Poles (*Pleuronectes cynoglossus*) were displayed on one fishmonger's slab on Feb. 3rd. This

must be an exceedingly abundant species in the Wash. Several others subsequently, undoubtedly taken from the same locality.

Long Rough Dab. An example, 16½ in., of *Hippoglossoides limandooides* came to hand on Feb. 21st.

Cuckoo Ray. A very beautiful Cuckoo Ray (*Raia miraletus*) was taken on a line just off Yarmouth on the night of April 3rd.

Curious Plaice. I received a Plaice (*Pleuronectes platessa*) on April 8th; it measured 11 in. Across the under side, quite in the centre of its length, ran a supplementary fin. There were three fin-rays towards either margin, and a connecting web joining each. Across the rayless centre the web still extended. The fin was quite free to work.

Greenland Bullhead. An example of *Cottus groenlandicus* was taken on a hook off Yarmouth by some long-line fishermen. Length, 7 in.—A. PATTERSON (Ibis House, Great Yarmouth).

C R U S T A C E A.

Meristic Variation in the Edible Crab.—A specimen of *Cancer pagurus* was given me on April 28th with one of the pincer-claws abnormally developed, a large double pointed fixed claw projecting from the lower claw. When the movable claw was opened the three made a perfect capital W.—A. PATTERSON (Ibis House, Great Yarmouth).

NOTICES OF NEW BOOKS.

Audubon and his Journals. By MARIA R. AUDUBON. With Zoological and other Notes by ELLIOTT COUES. 2 Vols. John C. Nimmo.

THE name of Audubon is a household word wherever Ornithology is followed ; it is interwoven in the annals of Zoology ; and with that of Agassiz is cherished in the fast advancing and now important cult of American Natural History. As stated in the Introduction : " His place as naturalist, woodsman, artist, author has long since been accorded him."

Audubon was an ornithologist by instinct and not by training ; he found his subject in the woods and took it from nature ; he deserted every pursuit to follow bird-life, as his financial experiences prove, and in losing everything which goes to make what is vulgarly called " success," he found the pleasure of his life, and achieved a lasting fame. From his own journal, which is here reprinted, two extracts relating to early days and manhood will mark this period of his career : " My father being mostly absent on duty, my mother suffered me to do much as I pleased ; it was therefore not to be wondered at that, instead of applying closely to my studies, I preferred associating with boys of my own age and disposition, who were more fond of going in search of birds' nests, fishing, or shooting, than of better studies. Thus almost every day, instead of going to school when I ought to have gone, I usually made for the fields, where I spent the day." In later life when he separated from his business partner Rozier, each wrote as they felt, Audubon saying : " Rozier cared only for money, and liked St. Geneviève ;" Rozier writing : " Audubon had no taste for commerce, and was constantly in the forest." Consequently we are not surprised at a subsequent period of deep depression when, " without a dollar in the world, bereft of all revenues beyond my own personal talents and acquirements," he felt, the only time in his life, " when the Wild Turkeys that so often crossed my path, and the thousands of lesser birds that

enlivened the woods and the prairies, all looked like enemies, and I turned my eyes from them, as if I could have wished that they had never existed." But this was only the probationary period, and Audubon was to emerge from the wilderness.

The "European Journals," which occupy a large portion of the first volume, detail his visit to these islands, with his portfolio of matchless drawings of the birds he had studied so long, and which belonged to the country he loved so well. He was well, nay, warmly received, and when in Liverpool, to which he was so grateful, Manchester that scarcely equalled his expectations, and Edinburgh, which fairly captivated him, we find recorded the friendships of many well-remembered eminent men, and traits and reminiscences of others perhaps more familiar to some of our readers, as Bewick, Jardine, Selby, and Swainson. We have one delicious insight into the then current philosophy of society. Captain Basil Hall "called to speak to me about my paper on Pigeons; he complained that I expressed the belief that Pigeons were possessed of affection and tenderest love, and that this raised the brute species to a level with man." It was during this journey that Audubon sought and obtained subscribers to his great work, and published the first numbers of the same. The visit to Paris produced few subscribers, but afforded an intercourse with the great Cuvier.

The trip to Labrador was made in 1833, with the object of "procuring birds and making drawings of them for the continuation of the 'Birds of America,' the publication of which was then being carried on in London. The Journal of this excursion is replete with the details of bird-life, and exhibits Audubon as a writer of great descriptive power. As we sail with him to the desolate land we are gradually prepared for the physical horrors of this ornithological paradise. "When we landed and passed the beach, we sunk nearly up to our knees in mosses of various sorts. . . . A poor, rugged, miserable country; the trees like so many mops of wiry composition, and where the soil is not rocky it is boggy up to a man's waist." The weather is most frequently described under the appellations of rains, fogs, hurricanes. The drawings were made on board ship, with all its uneasy movements, and the cold was sometimes so intense as to render holding the pencil a difficult task. Yet many nests were

found, numerous birds procured, and some good observations recorded. "The Scoter Ducks, of which I have seen many this day, were partially moulted, and could fly only a short distance, and must be either barren or the young bachelors, as I find parents in full plumage, convincing me that these former moult earlier than the breeding Ducks."

In 1843 Audubon made an expedition in the interest of the 'Quadrupeds of North America,' the narrative of which constitutes "The Missouri River Journals," and which is now in its entirety published for the first time. There is a great charm in the naturalist's account of a region which, as he saw it then, can never be witnessed again. The old frontier life, the wretched Indians, and the then abundant big game, are soberly described, and we read:—"We have seen much remarkably handsome scenery, but nothing at all comparing with Catlin's descriptions; his book must, after all, be altogether a humbug."

The "Episodes" which conclude the second volume exhibit Audubon as an adept in that most difficult literary art of "short story" writing, and in these days of popular reprints we shall never be surprised to see them reissued in a separate form. Dr. Elliott Coues has proved an efficient zoological editor throughout, and has contributed many valuable notes. Audubon was clearly not an all-round zoologist, for not only does he seem to make the very common and excusable error of most travellers respecting the identity of the Dolphin, but also on more than one occasion speaks of the Porpoise as a fish.

Life and Letters of Alexander Goodman More, with selections from his Zoological and Botanical Writings. Edited by C. B. MOFFAT, B.A., with a preface by FRANCES M. MORE. Dublin : Hodges, Figgis & Co., Limited.

A. G. MORE was one of those unique personalities with whom contact invariably produced friendship. Combined with this rare gift of provoking attachment, and being void of offence, he possessed the instincts of a true naturalist, and was endowed with many intellectual gifts; but in a world of limitations and compensations he was cursed with persistent ill health, which curtailed his official career, but could not prevent his rendering signal

service to Irish Zoology and Botany. Apart from his long service in the Royal Dublin Society's Museum, in which he eventually for a short period—until complete physical collapse ensued—succeeded Dr. Carte as Curator, his life-work must be sought in quiet and unobtrusive contributions to biological knowledge, to the assistance always rendered to other workers, and to the directing power given and enthusiasm afforded to the studies of young naturalists. Under these conditions it is difficult to analyze the career so well told in this volume, written by a sister who with unusual modesty describes on the title-page her memoir as a preface.

More's official connection with the Royal Dublin Museum commenced with his appointment as "first assistant naturalist" at the commencement of 1867. He succeeded the late Dr. Carte in the curatorship near the end of 1881, and after long physical suffering and hoping against hope for the renewed strength that never came, he resigned his position in 1887. During these twenty years, we read, "his room (in the museum) was the rendezvous of all naturalists who came to Dublin"; and after the assumption of his curatorship we find him writing to Prof. Newton: "I don't at all intend to die, or retire, for a long time yet. Not until you shall see what a Museum I will make it." He made many local natural history expeditions on behalf of his museum, and on one of these, in 1873, "a dredging and collecting expedition to Achill and the adjacent coasts," he met with an untimely adventure, from the effects of which he probably never recovered. On the lonely island of Inishkea, about eight miles north of Achill, is, or was, among its solitary inhabitants, a fetish named "Neve-ogue," about which the visitor was wise neither to enquire nor speak about. But stories had got abroad about the benighted condition of these western Irish, and a letter had appeared in print headed "Idolatry in the 19th Century." This had aroused the fierce indignation of the islanders, and, as not unusual, the wrong man paid the penalty. The unoffending More was surrounded by a group of angry islanders, "and before he could gather the meaning of the situation, a blow from a heavy piece of timber had stretched him on the ground" in an unconscious condition.

After his resignation, and while a hopeless invalid, he was still able to help the cause he had at heart, and from time to time

to engage in correspondence. In one of his letters at this time is an admonition that may be well laid to heart by all who are not thoroughly competent observers. "Do try and give up thinking you have *seen* any rare bird which you do not *shoot*. It is the most unsafe course in natural history, and leads to innumerable mistakes, and to the discrediting of the observer."

Of his papers reprinted in this volume are those "On the Distribution of Birds in Great Britain during the Nesting Season" ('Ibis,' 1865), and a supplement consisting of "Manuscript Notes in Mr. A. G. More's interleaved copy, with a Summary"; "On the Geographical Distribution of Butterflies in Great Britain," written in conjunction with T. Boyd ('Zoologist,' 1858); and "Outlines of the Botany of the Isle of Wight" (Stanford's 'New Guide to the Isle of Wight').

Mr. More was an old contributor to this Magazine during a period extending from 1849 to 1894, and many of the notes he thus published are also reprinted in the Appendix.

A Sketch of the Natural History (Vertebrates) of the British Islands. By F. G. AFLALO, F.R.G.S., &c. Wm. Blackwood & Sons.

BRITISH Zoology is not without a literature, and, judging from the plentitude of new books on the subject, we may rejoice that a popular taste has arisen for natural history subjects. Though well provided with standard books by competent authors on the different British Vertebrates, there was still room for a volume which combined the whole in an introductory but authentic method. This opportunity Mr. Aflalo has attempted to seize, and his book will be, no doubt, welcomed by those who wish to consult a primer that will prove an incentive and guide to more specialized study.

It is not an altogether unusual reproach, that some readers, and a few reviewers, are satisfied with the perusal of a preface or introduction. We can only remark that if such scanty attention was paid to this volume, the result would still be an acquaintance with one of the most interesting general essays on British Zoology that has been written for a long time. We are too apt to seek biological phenomena in other zoological regions, and to ignore the lessons to be learned in our own islands. Many who have

studied the peculiarities of insular faunas can well be reminded that that of the Isle of Wight is a home lesson, and as our author remarks : " Yet it is surely not quite devoid of interest that in that little outpost of England, separated from the New Forest and the most fishful rivers in the south country by a mere ditch, the woods should afford shelter to but few Owls and Woodpeckers, the streams hold neither Pike, nor Perch, nor Chub, nor Gudgeon ; that the Ring Ousel should abstain from breeding there ; that the Toad should be commoner than the Frog, the Viper in excess of the more harmless snake." Again, among the many singular and obscure causes which regulate or modify the presence of migratory species, an excellent example is drawn from the Channel Islands, where, according to Smith, ' Birds of Guernsey,' " since gin took the place of cider as the national beverage, the orchards have been abandoned, and the whole country is under vegetables for the early London market."

Mr. Aflalo is very conservative in the admission of visitant species to our fauna. Thus he omits the Turtles from the list of British Vertebrates, and gives an instance of how these Chelonians may have had a purely artificial introduction. He is, however, somewhat obscure in the paragraph devoted to the Flying-fish, which, we read, finds its way into our waters, *if ever*, at long intervals only ; and subsequently that "there seems to be *little doubt* of the occurrence of living examples on our south-west coast." The italics are our own.

It is impossible in our space to notice or summarize the main details of the book, which are devoted to the Mammals, Birds, Reptiles, Amphibians, Fishes, and Lowest Vertebrates—Lampreys and Hag-fishes. The information thus given will prove useful to those who seek concise information in a convenient referential manner, though it must be remembered that few writers are sufficiently equipped to prevent some stumbles in so wide a purview of British Zoology.

Two useful Appendices are given, which comprise "Materials for a Bibliography of Books on the British Vertebrate Fauna," and "A List of Natural History Societies and Field Clubs in the United Kingdom." With reference to the first, and in relation to the scanty literature on British Reptiles, mention should have been made of the series of articles by the late Edward Newman in 'The Zoologist' for 1869.

The Mammals, Reptiles, and Fishes of Essex. By HENRY LAVER, M.R.C.S., &c. Chelmsford: Edmund Durrant & Co.; Buckhurst Hill: The Essex Field Club; London: Simpkin, Marshall & Co. Limited.

THIS publication forms Vol. III. of the "Essex Field Club Special Memoirs," and is a welcome addition to our county faunistic lists. With Mr. Miller Christy's 'Birds of Essex' we now possess handbooks—so far as present knowledge permits—of the vertebrate fauna of the county.

Essex offers unusual advantages to the naturalist; Epping Forest alone is a household word; it possesses a sea-board; six rivers—Thames, Lea, Chelmer, Blackwater, Colne, and Stour—afford means of investigation in the freshwater fauna; there are wide margins of marsh; whilst now that environmental conditions are more studied it must be remembered that "the climate of Essex is dry, the average rainfall being lower than in any other English county." To these natural advantages may be added the institution of the "Epping Forest and County of Essex Naturalists' Field Club," which has really fostered the study of the local natural history, and focussed the work of Essex naturalists. Thirty-eight terrestrial mammals—excluding two doubtful Bats (*Rhinolophus ferrum-equinum* and *Vespertilio murinus*), and an introduced species of Jackal—are enumerated, and ten marine mammals, which, however, include so scarce or unwilling a visitor as the Sperm Whale (*Physeter macrocephalus*). In the Reptilia, besides the Viviparous Lizard and the Blind Worm, the Common Snake, three Batrachians, and three Newts are found. The Natterjack Toad has still to be discovered and recorded. In Fishes 113 species are enumerated, but here of course large additions will constantly be made as the marine fauna is more studied. Local lists of fishes in the different rivers supply a want, though none was procurable relating to the Cam, which rises in the north-west corner of the county, but soon leaves the district. This river "holds two species, apparently naturally absent from all the rest of our Essex rivers," the Grayling, lately introduced into the Lea, and the Spined Loach.

Some beautiful illustrations by Mr. H. A. Cole embellish a small but most useful book.

Hints on the Management of Hawks (second edition); to which is added *Practical Falconry, Chapters Historical and Descriptive.* By JAMES EDMUND HARTING. Horace Cox.

HAWKING is an old pastime. We often in the present day hear, or read, that racing is "the sport of kings," but there is no doubt that hawking really once came under that description. Dear old Burton, in his 'Anatomy of Melancholy,' referring to the writings of Paulus Jovius, remarks of that author, that he doth in some sort tax "our English nobility for it, for living in the country so much, and too frequent use of it, as if they had no other means but hawking and hunting to approve themselves gentlemen with." It must, however, have been a fine sport then, and in an attenuated form can be still practised now, as Mr. Harting's pages amply testify. Possibly its mildest aspect was—again quoting Burton—when the Persian kings hawked butterflies with sparrows "made to that use."

This is one of those interesting books which prove how a scientific ornithologist can write like a good sportsman—using that word in its real and not current definition; and also shows how sport and a knowledge of natural history can and should go together. Both in "Hints on the Management of Hawks," and in the space devoted to "Practical Falconry," the reader who does not pursue the sport will find much to instruct him in the nature and names of birds of prey, while the chapters on "Devices for taking Hawks" and "Indian Snares for Hawks" enter the domain of another work on the 'History of Fowling,' recently noticed in these pages (*ante*, p. 134).

The illustrations leave nothing to be desired, and Mr. Harting is to be congratulated on issuing a revised and amplified second edition of a work which appeals both to the sportsman and the naturalist, and possesses the literary charm incidental to a wide reading on the subject.

EDITORIAL GLEANINGS.

DR. HENRY WOODWARD, in the 'Geological Magazine' (Decade iv. vol. v. p. 49) has illustrated and described a pair of gigantic antlers of the Great Red Deer (*Cervus elaphus*, Linn.):—

"In 1891, Frank S. Goodwin, Esq., of Bakewell, Derbyshire, presented to the British Museum (Natural History) a pair of antlers of Red Deer, with fragments of the calvarium attached, which had been obtained, with other cervine remains, from a tufaceous deposit of comparatively modern date near Bakewell, Derbyshire. Owing to the loss of all animal matter the antlers were in a very friable condition, and fell in pieces on being handled, although at some distant time they had been repaired partially with long strips of calico.

"Two causes rendered them of interest: firstly, they were of unusually large size, resembling the great American Wapiti (*Cervus canadensis*) in stoutness and length of beam; secondly, they proved to have been described in a letter from the Rev. Robert Barber, B.D., to John Jebb, Esq., M.D., F.R.S., which was published in the Phil. Trans. Royal Society for 1785 (vol. lxxv. p. 353).

"Notwithstanding their almost hopeless state of dilapidation they attracted the attention of Sir Edmund Giles Loder, Bart., and Mr. J. G. Millais (the latter of whom examined and made drawings of them about a year ago). An attempt was made to bring the broken antlers together again, and after much time and labour expended by Mr. C. Barlow, the Formatore, they have at length been successfully rehabilitated, and are now exhibited on the top of pier-case No. 16 in the Geological Gallery devoted to fossil Mammalia, where they form, from their size and whiteness, one of the most striking objects in the series of cervine remains.

"The following measurements have been taken since the antlers have been repaired and mounted in the Gallery:—*

MEASUREMENT OF ANTLERS OF *Cervus elaphus* FROM ALPORT, YOULGREAVE.

	ft. in.		ft. in.
Width at the 'nests'	3 9	Girth of pedicle	0 7½
Length of right antler ...	4 0	," above the burr ...	0 9¾
" left " ...	3 8	" 1st tine	0 9½
" brow-tine	0 11	" 2nd "	0 6½
" 2nd "	1 0	" 3rd "	0 6¼"
" 3rd "	1 1		

* See also 'British Deer and their Horns,' by J. G. Millais, p. 96, fig. 2, and p. 105.

In connection with the 'Geological Magazine,' it is interesting to learn from Dr. Woodward of its considerable longevity. Writing in December, 1894, he was able to announce:—"It is now more than thirty years ago since, with my friend Prof. T. Rupert Jones, F.R.S., we commenced to edit the 'Geological Magazine,' Messrs. Longmans & Co. being our publishers. Out of the long list of distinguished supporters and contributors to the 'Geological Magazine' published in 1864, I rejoice that twenty-four original names still remain after more than thirty years, namely:—The Duke of Argyll, the Earl of Ducie, Sir Archibald Geikie, the Right Hon. Thomas Huxley, Sir John Evans, Prof. Prestwich, Prof. T. G. Bonney, Prof. Wiltshire, Prof. Boyd-Dawkins, Prof. Alphonse Milne-Edwards, Prof. Dr. A. Fritsch, Prof. A. von Koenen, Prof. E. Hull, Prof. H. G. Seeley, Mr. R. Etheridge, Mr. William Carruthers, Mr. William Whitaker, Rev. O. Fisher, Mr. James Carter, Mr. James Powrie, Mr. R. H. Valpy, Mr. G. C. Churchill, Mr. R. F. Tomes, and Mr. E. C. H. Day." This list is unfortunately not quite so complete as when published, but the magazine has lost none of its vitality.

At a meeting of the Linnean Society, held on March 3rd, Mr. W. A. Herdman read a paper by Mr. F. J. Cole, entitled "Observations on the Structure and Morphology of the Cranial Nerves and Lateral Sense-Organ of Fishes, with especial reference to the Genus *Gadus*." It contained the first description of the lateral-line organs of *Gadus*, and pit-organs were shown to be present. The author concludes that the lateral-line system of fishes was not originally metamerie, and that it has nothing to do with the branchial sense-organs. He regards it and the auditory organs as parts of a system, and their nerves (*viz.* the superficial ophthalmic, buccal, external mandibular, lateralis, and lateral-line nerves), together with the auditory, as of a series *sui generis*, and shows that the so-called lateral-line nerve of *Petromyzon* really belongs to the lateralis accessorius system (ramus lateralis trigemini, *auct.*), the morphology of which he fully describes. The paper dealt exhaustively both with the afore-mentioned and the subsidiary branches of the subject, which was treated in detail and historically, with an accompanying exhaustive bibliography. Prof. Howes, discussing the subject, drew attention to some observations of the cousins Sarasin, and to the experimental work of Sewall, Steiner, Lee, and others upon the auditory apparatus of fishes, which supported the author's conclusions. Referring to the investigations of Coggi, he threw out the suggestion that the secondary extension of the saccus endolymphaticus into the dorso-lateral region of the trunk—since it reaches its maximum in batrachians in which, although the tegumental canal-system is developed and lost, a partially aquatic habit is retained—might perhaps involve the auditory and lateral-

line apparatus in a correlated substitutional modification for the performance of the static and equilibrative functions, and thus further support the author's views.

At a subsequent meeting of the Linnean Society, held on April 21st, Mr. W. P. Pycraft read a paper "On the Morphology of the Owls: Part I. Pterylography." In this, the first instalment of a series of papers on the affinities and phylogeny of the group, the pterylographic characters were alone considered, with descriptions of adults, nestlings, and embryos. The author remarked that so far as the distribution of the feather-tracts is concerned, the Owls resemble the Accipitres more nearly than any other group. They differ from them and resemble the Caprimulgi in the distribution of the adult and nestling down. The microscopical structure, however, of these down-feathers is accipitrine rather than caprimulgine. The nestling of the Accipitres is clothed by two kinds of down-feathers, for which the names "pre-plumulæ" and "pre-pennæ" were suggested; the nestling Owl and Nightjar are clothed only by down of the latter kind. The form of the external aperture of the ear seems to have been originally subject to variations, the most successful of which have become fixed by selection. In some cases there is a marked asymmetry, which may either be confined to the membranes surrounding the aperture or may extend to the skull itself. The author considered that the facts disclosed by a study of the pterylosis might justify a slight revision and rearrangement of some of the genera.

MR. ERNEST W. L. HOLT, at a meeting of the Zoological Society of London, held on April 19th, read a paper on the breeding of the Dragonet (*Callionymus lyra*) in the Marine Biological Association's Aquarium at Plymouth, and made some remarks on the significance of the sexual dimorphism of this fish, the courtship and pairing of which were described in detail. The female was described as a promiscuous polyandrist, and seemed to exercise no sort of choice, taking the nearest male which appeared to be in a condition to further her object. The males were much more numerous, as well as larger, than the females. The brilliant yellow colour of the mature male was due to an excess of yellow pigment, which diffused into the skin. It had an acrid smell, and was highly irritating to the salivary glands. The blue colour was due to the optical properties of masses of "reflecting tissue" over a background of black chromatophores. Mr. Holt considered that the large fins and bright colours of the male of the Dragonet had been evolved by sexual selection proceeding on the lines of conspicuousness rather than on those of æsthetic charms, since the male seemed to be unable to see the female except at a very short distance, and

the converse would no doubt hold good if the male was not conspicuously coloured.

IN 'Timehri,' the Journal of the Royal Agricultural and Commercial Society of British Guiana, Mr. J. J. Quelch has published an excellent contribution to our knowledge of "The Boa-Constrictors of British Guiana." We may quote the following statements as being of general interest to zoologists :—

"In size this Water-Boa seems to exceed all other snakes, and it would appear to be more deserving of the ancient name Anaconda than the eastern forms to which it was first applied. In fact, it may be said that the name is almost limited nowadays to this tropical American species. The length is known to reach 37 ft., but it is said that much larger specimens have been taken. On this point, however, it is hardly safe to express an opinion, since unless definite measurements are made the estimate of size can be of little value. A case in point, which would suggest caution in accepting the great lengths ascribed to certain animals, may be quoted from the writer's experience as regards the large Black Alligator, locally known as Caiman (*Alligator niger*). The length of this form is given by various travellers in the colony—as, for instance, by both Brown and Schomburgk—as from 20 to 25 ft., Waterton even recording 30 ft.; but there is no statement of actual measurement. In the writer's experience the largest forms of this species, taken in the very districts referred to by the fore-mentioned travellers, hardly exceeded 14 ft., though when seen in the water they appeared to be considerably larger. A similar example may be found in the great Arapaima Fish (*Arapaima gigas*), which is recorded as from 16 to 18 ft. in length, while in reality they hardly attain to more than half that size. Actual measurement is requisite in all such cases.

"Skins of the Water-Boa of from 18 to 25 ft. in length are frequently obtained, and in the sheltered swamps and along the creeks in the recesses of the forests it may well be that considerably larger animals would be met with. The following experience along the higher Essequibo River tends to support this. In 1894, while passing by a wide outgrowth of closely-matted grass from the swampy bank, the boat disturbed an enormous Snake, of which the head, neck, and part of the body were clearly seen at a distance of certainly not more than five feet. It was noticeable that the head was considerably more than twice as large as that of one of about 20 ft., and this seems to indicate a Snake of very large proportions. The unfortunate part of the matter is that Snakes of very great size are most likely to be seen in places where it is out of the question to secure them, as it happened in this particular case."

IN the 'Essex Naturalist' (1897, p. 169), Mr. H. C. Sorby has contributed "Notes on the Food of Oysters in Essex":—"Some years ago I was led to think that very much remained to be discovered with regard to the food of Oysters in different localities. No reliance can of course be placed on the examination of the contents of the stomach after the Oysters have been kept for some hours out of the natural water, since the food would be digested; and the sooner they are examined the better. When lying in the yacht at Paglesham, I had a good opportunity for studying this question, since my friend Mr. James Wiseman gave orders to his men to supply me with Oysters, which were brought to me and the contents of the stomach examined with a microscope only a few minutes after having been taken out of the water; so that some of the diatoms they had eaten were still alive. I found that at Paglesham the chief, if not the entire, food was diatoms. Soon afterwards I had the opportunity of observing Oysters taken out of Brightlingsea Creek, and which were examined as soon as I could, but not so immediately as in the case of those at Paglesham. I was surprised to find that the food of the Brightlingsea Oysters was very different. Diatoms were few in number, or absent; but, on the contrary, the stomachs contained very small animals, which I took to be Infusoria, or small larvæ, not easily identified. At all events, the contrast in these two cases was so great as to readily explain why the growth and flavour of Oysters fed in different waters may be so different."

WE have received from the Society for the Protection of Birds a tract entitled 'The Trade in Birds' Feathers,' reprinted from the 'Times.' The first instalment is a letter written to that journal by Mr. W. H. Hudson, from which we extract the following details:—

"Thursday, Dec. 14th, was a purple day at the Commercial Sale Rooms in the City, where feathers for the decoration of our women formed the attraction, and besides some hundreds of boxes of white Ospreys an incredible number of bird-skins of brilliant plumage, collected from all quarters of the world, were disposed of. Birds of modest-coloured plumage were also to be had; and it was surprising to see huge cases filled with Tits and other small species from Japan, a proof that the once artistic and bird-loving people of that distant beautiful country are anxious to be up to date and Western in all things, even to the extermination of their little feathered fellow-creatures. There were also some magnificent Pigeons, the most notable being the Bronze, the Goura, and the Victoria Crowned Pigeon. A curious destiny—to be pulled to pieces and used in the ornamenting of hats—of the last noble Dove, appropriately named after our august and tender-hearted Sovereign, whose love of all things, both great and small, is so well known to her subjects. Conspicuous even among the most

splendid species were the Birds of Paradise—upwards of two thousand specimens.

"From the Western world it was interesting to see two such birds as the Rupicola, or Cock-of-the-Rock, and the once sacred Quetzal; the first the most vividly coloured, the second the loveliest, bird on that continent, perhaps on the globe. Both species are known to be excessively rare, and it cannot be hoped that they will long escape a fate which has overtaken other persecuted species of less value commercially.

"Other kinds—Argus and Impeyan Pheasants, Jays, Trogons, Kingfishers, Orioles, Tanagers, innumerable Humming-birds, and many more—need not be spoken of in detail. I will only mention the Parrots, for there were many—125,300 specimens, mostly from India. Spread out in Trafalgar Square, they would have covered a large portion of that space with a gay grass-green carpet, flecked with vivid purple, rose, and scarlet."

The 'Times,' commenting on this communication in a leading article under date of Dec. 25th last, observed :—

"It will be said perhaps that the slaughter and sale of these birds is all in the way of legitimate trade, a mere commonplace matter of supply and demand; that the law of nature is a law of rapine and ruthless slaughter; that the fowler for gain who pouches a Humming-bird or a Bird of Paradise, with as little misgiving as an angler baskets a Trout, is a mere instrument of this law to which birds themselves are subject both actively and passively; and that at worst he deals swift death to animals which would otherwise fall victims to their fellows, or to some other agency of nature 'red in tooth and claw.' All this is true, and perhaps to some extent it justifies the fowler and the trader. But it does not touch the wearer. She is the root of the evil. The wearing of feathers taken from birds slaughtered for the sake of them is in no sense a necessity. It does not minister in any way to the comfort or welfare of man, woman, or child. It is a mere vanity and fashion—a custom, if women would but think so, infinitely more honoured in the breach than in the observance. A large proportion of the birds whose feathers women wear are slain only for their sake. If the demand were extinguished the slaughter would cease, and the birds would live their own lives subject only to the appointed laws of their own being."

THE 'Star' recently "interviewed" Mr. Jamrach, the well-known dealer in wild animals. We gather from the information extracted that "Lions are at a discount; they breed too many in the 'zoos.' Elephants are steady (on their feet) at £100 apiece—rather a drop that from twenty years ago, when Jumbo fetched £2000, and the average ran £400 to £500! Giraffes are pretty high (every way). The closing of the Upper Nile and the loss of

Khartoum sent the prices sailing. Giraffes went as low as £60 before that ; now they go up to £500. There are plenty, but we cannot get them. The last man who went out Giraffe-hunting lost his head."

THE British Museum authorities have purchased Gilbert White's original manuscript of his 'Garden Kalendar' from 1751 to 1767—an important work, a small portion of which only has been published.

SINCE the death of Charles Darwin, his home, Down, not far from Bromley, has remained in the possession of his family. For much of the time it has been unoccupied, and it is suggested that if his family were willing to part with it, it might be purchased in order to preserve a permanent memorial of him in some way.

THE efforts which have been made to stock the rivers of Natal with Trout and Salmon have at length been crowned with success, says the 'Natal Witness.' In 1889, Sir Charles Mitchell, Governor, appointed a Committee, with Mr. Cecil Yonge as Chairman, to see what steps could be taken, and two grants of £500 each were made. These were supplemented by a smaller sum from the Government and by subscriptions from the public, and operations were carried out from 1890 to 1892. During that period 9098 young Trout-fry were imported and turned into some of the larger rivers, and efforts were made to stock the Umkomazi River with Salmon. Judging by the report of Mr. Yonge, just handed to the Minister of Agriculture, it would appear that the results of the efforts to introduce Trout are extremely satisfactory, particularly in the case of the Bushman's River. The report contains the following recommendations :—(1) That the Government continue to preserve and close ten miles of the Bushman's River with the drift known as Robinson's, or Ulundi, as the centre, under the supervision of a caretaker. (2) That the Umgeni be also preserved from above the MacArthur Falls. (3) That the importation of ova be continued, and in this connection that inquiry be made as to whether or not a supply of ova and breeding Trout could be obtained from the Cape Government. (4) That steps be taken to obtain a supply of young fry and spawn from the Bushman's River for future breeding purposes, and that a rearing pond or ponds be made in the vicinity of the Bushman's River, at a distance of about three hours' ride from Mooi River Station.

" THE Danish Lieut. Olussen, Dr. O. Paulsen the botanist, and Dr. A. Hjuler the naturalist are to leave Copenhagen this month (March) for their scientific expedition to Central Asia. Their first object is the exploration

of the Jaschikul lake in the Alittschur Pamir, which lies 12,090 ft. above the sea-level, and to which they travel through Kashgar and Yarkand. Thence the expedition will cross over the difficult passes into the province of Bakhau, in the South Pamir, where photographs and plans will be taken of the ruins belonging to the period of the 'Siaposcher.' The explorers intend to spend the winter of 1898-9 in the province of Ischkaschin, in the territory of Bokhara, where a meteorological station will be erected, and researches made in botany, zoology, and ethnography. In the summer of 1899 the expedition will journey along the Amu-Darya to Khiva, on the Sea of Aral, where the ruins of the flourishing period of the history of Khiva are to be photographed. The costs will be provided in part by the Danish State, partly from the Carlsborg Fund, and partly by A. Nielsen, the Danish Consul in Rostow."—*Athenæum.*

THE ornithology of the Philippine Islands has been much studied of late years in this country, and many papers thereon have been published by the late Marquis of Tweeddale, Dr. Bowdler Sharpe, W. R. Ogilvy-Grant, A. H. Everett, and others. In the Proc. U. S. Nat. Museum there has recently appeared "A List of the Birds known to inhabit the Philippine and Palawan Islands, showing their distribution within the limits of the two Groups," written by Dean C. Worcester and Frank S. Bourns. Both these authors have collected on the spot, and they have studied the available literature on the subject, giving a bibliography of papers consulted. Differentiating the *political* and *zoological* areas, they have separated the Palawan group—of Bornean affinities—from the "Philippines proper." In a list of known species, excluding those which occur in the Palawan group, but have not yet been found in the Philippines, 526 species are enumerated. A map and six distribution charts add to the value of a valuable contribution to zoogeography.

MR. WALTER FAXON has published in the Proc. U. S. Nat. Mus. Washington some "Observations on the *Astacidae*, &c.," which may be taken as supplementary to his "Notes on American Crayfishes," issued in 1890. The paper generally is naturally of a technical description, but many observations are recorded as to the habits of these interesting creatures. *Cheraps bicarinatus*, Gray, according to Eyre, as quoted by Gray, "is found in the alluvial flats of the river Murray, in South Australia, which are subject to a periodical flooding by the river. It burrows deep below the surface of the ground as the floods recede and are dried up, and remains dormant until the next flooding recalls it to the surface. At first it is in a thin and weakly state, but soon recovers and gets plump and fat, at which

time it is most excellent eating. Thousands are procured from a small space of ground with ease, and hundreds of natives are supported in abundance and luxury by them for many weeks together. It sometimes happens that the flood does not occur every year, and in this case the "eu-kod-ko" lie dormant until the next, and a year and a half would thus be passed below the surface. I have often seen them dug out of my garden, or in my wheat field, by men engaged in digging ditches for irrigation. The floods usually overflow the river-flats in August or September, and recede again in February or March."

"According to Nicolet, Crayfishes are found in the rivers, brooks, and even in the forests of southern Chile, where they live in holes in the ground, around the entrance of which they construct earthworks in the shape of a cone nearly a foot in height. As is well known, *Cambarus diogenes*, Girard, erects similar mud towers or "chimneys" in the United States, and Mr. P. R. Uhler tells me that *Cambarus dubius*, Faxon, has the same habit in Western Virginia. Titian R. Peale informed Girard that he had observed mud chimneys, altogether similar to those of *C. diogenes*, along the Rio Magdalena in New Grenada, several hundred miles from the seashore. But the builders of these chimneys in New Grenada still remain unknown to science. In this connection it is worthy of note that the earliest mention of adobe towers erected at the mouth of crustacean burrows occurs in Molina's work on the Natural History of Chile, p. 208."

We have received the Report of the Council of the Zoological Society of London for 1897, which proves the Society, both scientifically and financially, to be in a highly prosperous condition. In the Gardens at Regent's Park the principal new building is the Ostrich and Crane house, commenced in 1896 and finished in March last year. During the past summer also a new glass house for reception of the Society's collection of Tortoises has been built adjoining the Reptile house at a total cost of £464 14s. 8d., which amount, however, will ultimately be lessened by the sum of £150 which the Hon. Walter Rothschild, F.Z.S., who is especially interested in these animals, has kindly contributed towards it. The removal of the Tortoises into their new house, which seems in every way adapted for their requirements, enables the public to view them with much greater facility than was the case in the building formerly allotted to them on the other side of the Gardens. It is also of great advantage to have the whole of the specimens of living Reptiles and Batrachians placed under the same care, and arranged in the same part of the Gardens.

The total number of deaths of animals in the Gardens during the year 1897 was 1196 as against 986 in 1896. This increase of 210 is chiefly due to the large number of small Reptiles received during the year. The

number of important deaths has been rather larger than usual. No fewer than six anthropoid Apes have died, *viz.* a Chimpanzee, two Orangs, and three Hoolock Gibbons. Among the larger Carnivora there have been also some losses. A young Tiger, two Cheetahs, two young Lions, and the Snow Leopard are among the most important of these. As an instance of longevity in confinement may be mentioned the Amphiuma, which was acquired in 1870, having thus lived twenty-seven years in the Gardens. A Reticulated Python, which was supposed to be the largest ever exhibited, had been at the time of its death twenty years in the Gardens. Two Burchell's Zebras, mother and foal, a White-bellied Pangolin, an Apteryx, and a Hyrax complete the list of the more noteworthy deaths during the year.

The number of animals belonging to the first three classes of Vertebrates living in the Society's Menagerie at the close of 1897 was 2585, consisting of 792 mammals, 1362 birds, and 431 reptiles. The corresponding number on Dec. 31st, 1896, was 2473. The total number of registered additions to the Menagerie in 1897 was 1508, of which 688 were acquired by presentation, 278 by purchase, 104 were bred in the gardens, 330 were received on deposit, and 108 obtained in exchange. The total number of visitors to the Society's Gardens in 1897 was 717,755, showing an increase of 52,751 as compared with the corresponding number in 1896. The Diamond Jubilee, as well as the fine weather, no doubt combined to contribute to this result. No such large number of visitors has entered the Society's gates since the year 1884.

The quantity and nature of the food required for the animals in the Society's Gardens are shown by the subjoined table :—

Provisions consumed in the Society's Menagerie during 1897.

Clover	126½ loads	Biscuits	295 cwt.
Hay.....	133½ "	Bread	6081 qtn.
Straw	215½ "	Milk	4914 qt.
Oats.....	144 qr.	Eggs	26,404
Wheat.....	44 "	Horses	225
Beans	4¾ qr.	Goats.....	236
Maize	70 "	Flounders.....	2190 lb.
Bran	294 "	Whittings	21,360 "
Canary	18 "	Rough Fish	1016 "
Hemp	11 "	Shrimps	1248 qt.
Rape	1 "	Fowl-heads	9380
Millet	5½ "	Greens	4280 bunches
Barley	27½ "	Onions	5½ bush.
Buckwheat	6½ "	Cress	3650 bunches
Rice	76 cwt.	Nuts	26½ pecks
Oil-cake	43 "	Lettuce	502 score
Mawseed	35 lb.	Apples	154 bush.
Ground Nuts	39 cwt.	Pears.....	40 "
Barley Meal	56 lb.	Grapes	1082 lb.

Dates	1452 lb.	Marrows	45½ doz.
Carrots	87½ cwt.	Melons	26
Oranges	204 hundreds	Bananas	1278 doz.
Potatoes	71 cwt.	Turnips.....	3½ cwt.
Cherries	19 baskets		

"NOTES on the Introduction of the Brown Hare into Ireland" is the title of a paper contributed by Mr. G. E. H. Barrett-Hamilton to the 'Irish Naturalist' for last March. It has been prompted by the publication of Dr. Scharff's paper "On the Origin of the European Fauna" (Proc. R. I. Acad. ser. iii. vol. iv. July, 1897). To summarize in the words of the author :—"In the memoir alluded to above, Dr. Scharff remarks that 'the difficulty of establishing the English Hare permanently' in Ireland 'is altogether unconnected with climate or food,' and that he believes that the distribution of the two species in Europe generally seems to indicate that they will not live together (*op. cit.* i. pp. 435 and 471). If this be so, and if, as Dr. Scharff believes, the English Hare is probably the stronger of the two species, then, all other things being equal, we should expect introductions of the English Hare into Ireland to be extremely successful, since in that country not only is the native Hare a presumably weaker species, but whole tracts of country are quite without Hares at all. On analysis of the twelve instances of the introduction of Brown Hares into Ireland, of which I have been able to give some particulars, this is found to be the case. Of these introductions ten may, I think, be regarded as authenticated —viz. those which took place at Copeland Island, Trabulgan, Powerscourt, Cleenish Island, Strabane, Castle Hyde, Fermanagh, Baronscourt, Castle-martyr, and Lurgan. On further examination, however, it is at once evident that in several instances the imported animals were never really given a fair chance of establishing themselves in their new homes, and particularly in the case of Copeland and Cleenish Islands, where the Hares were confined to a narrow space, and probably also artificially fed. At Trabulgan the Hares were imported expressly to be killed by coursing ; at Powerscourt they were either injured in the transit to Ireland, or were killed as soon as they left the protection of the demesne, and similarly in most of the remaining instances their extermination was only brought about by man himself. Yet, in spite of the efforts of their enemies, whether legal or illegal, to destroy them, we have evidence—in many of the cases which I have cited—of their power to become permanently established when given a fair chance, and the success of the Strabane introduction is alone a sufficient proof of this."

"The refusal of the English Hares to associate with the Irish species, as reported in more than one instance, is of interest, and tends to support Dr. Scharff's views that the two species are antagonistic, and that the Brown

Hare, being the stronger of the two, has driven the other out of the European plain into the mountains. This supposition is further supported by the behaviour of the two species in Scotland, where their respective ranges meet."

Some other interesting facts are given as to the introduction of Irish Hares into Great Britain, and Scotch Hares in Ireland and South Scotland.

OUR excellent and invigorating contemporary, 'Natural Science,' in its last number, remarks on the present somewhat dilapidated condition of the Newcastle Museum—that is, the building, not the contents. "The connection of this Museum with Albany and John Hancock is well known, and many other naturalists of repute have carried on their work there. In consequence of this the collections are of more value than is usual in a provincial museum, and it is certainly some consolation to find" that the members of the Natural History Society of the Counties of Northumberland, Durham, and Newcastle held a special meeting on March 16th to consider how funds could be raised to provide the necessary repairs. We are glad to see that considerable financial support was promised, and that before long there is every prospect of the necessary £2500 being acquired.

WE regret to notice the deaths of Mr. George Christopher Dennis, for many years President of the York and District Field Naturalists' Society, which took place on the 22nd of last December; and of Mr. James I'Anson, a valued President of the Darlington and Teesdale Naturalists' Field Club, on the 30th March.

A SPECIMEN of the Common Sandpiper, seen in St. James's Park, is recorded in the 'Field' of May 7th:—"On April 25th I had the unusual pleasure to a Londoner of seeing a Common Sandpiper (*Totanus hypoleucus*) in St. James's Park, just outside the Cormorant's inclosure, and on the edge of the island. I saw it alight, uttering its usual sharp note, and it seemed as much at home there as on a Welsh llyn or a Scottish lochside, stepping daintily along, with much tail-waving, in search of food. The keeper had not seen it, though he knows the bird as a casual spring visitor there, and it is not unknown on passage on the Serpentine and the foreshore at Battersea."—CHARLES H. EMSON.

